CLASS VI CORE ANALYSIS

INJECTION WELL 357-7R
40 CFR 146.82(c)(4),(7) and 146.87(b)

ELK HILLS A1-A2 PROJECT

Monterey Formation A1-A2 Core Analysis

Mineralogy

X-ray diffraction data has been compiled and compared from 9 wells with a total of 108 data points. Clay speciation has been found to be consistent throughout the Area of Review. Offset well 367-7R supplies an example of the mineralogy for the reservoir (Figure 1). The location of well 367-7R is shown on the map in Figure 3.

Figure 1: 367-7R mineralogy for the Monterey Formation A1-A2 reservoir.

BECHTEL PETROLEUM OPERATIONS, INC.
367-7R
ELK HILLS FIELD

FILE # 17019

MINERALOG™ ANALYSIS (WEIGHT %)

DEPTH	GDI	SAMP. WT	QTZ	CHRT	OP-A	OP-CT	ALB	OLIG	ANDE	KSPAR	CALC	DOLO	PYR	KAOL	CHLOR	ILL/SMEC
8551.9	2.62	8.34	30	13	0	0	17	0	2	21	2	0	1	0	0	14
8552.0	2.62	9.41	28	13	0	0	14	10	0	15	3	0	0	0	3	14
8554.1	2.62	10.73	45	0	0	0	19	0	2	20	4	0	0	0	0	10
8560.6	2.62	11.57	44	0	0	0	15	11	0	17	5	0	0	2	0	6
8570.0	2.62	8.32	43	0	0	0	17	8	4	17	3	0	0	0	0	8
8593.0	2.62	14.88	45	0	0	0	15	11	0	18	4	0	0	0	0	7
8608.9	2.60	18.83	21	21	0	0	15	0	10	14	2	0	0	0	0	17
8634.9	2.62	21.65	44	0	0	0	16	13	1	17	3	0	0	0	0	6
8648.6	2.62	14.16	47	0	0	0	18	3	5	19	3	0	0	0	0	5
8649.2	2.62	15.56	49	0	0	0	18	0	4	18	3	0	0	2	0	6
8649.8	2.62	8.73	50	0	0	0	17	0	4	17	1	2	0	3	0	6
8650.9	2.62	11.24	45	0	0	0	14	9	4	17	2	1	0	2	0	6
8651.8	2.62	8.75	46	0	0	0	16	0	6	19	3	0	0	0	0	10
8656.0	2.63	23.81	38	0	0	0	14	10	4	14	12	2	0	0	0	6
8702.6	2.61	10.56	40	13	0	0	15	0	5	18	2	0	0	0	0	7

GDI = GRAIN DENSITY INDEX
SAMP. WT = WEIGHT OF FRESH SAMPLE CRUSHED FOR ANALYSIS
QTZ = QUARTZ
CHRT = CHERT
OP-A = OPAL-A
OP-CT = OPAL-CT
ALB = ALBITE
OLIG = OLIGOCLASE

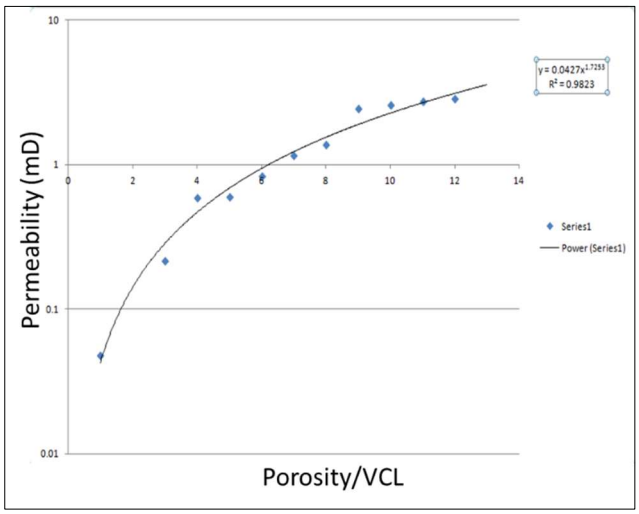
ANDE = ANDESINE
KSPAR = POTASSIUM FELDSPAR
CALC = CALCITE
DOLO = DOLOMITE
PYR = PYRITE
KAOL = KAOLINITE
CHLOR = CHLORITE
ILL/SMEC = ILLITE + SMECTITE

Clean reservoir sand intervals have an average of 43% quartz, 38% potassium feldspar, albite and oligoclase as well as 7% total clay.

Permeability

Log-derived permeability is determined by applying a core-based transform that utilizes mercury injection capillary pressure porosity and permeability along with clay values from x-ray diffraction or Fourier transform infrared spectroscopy (FTIR). Core data from 13 wells with 175 data points were used to calibrate log porosity and to develop a permeability transform. An example of the transform from core data is illustrated below (Figure 2).

Figure 2: Permeability function for the Monterey Formation A1-A2 reservoir. The function was defined by mercury injection capillary pressure analysis. Continuous permeability for the static model is calculated based on open-hole well log derived porosity and clay volume.



Example core report data of the MICP porosity and permeability from offset well 317-8R (Table 1). The location of well 317-8R is shown on the map in Figure 3.

Figure 3: Location of wells 367-7R and 317-8R.

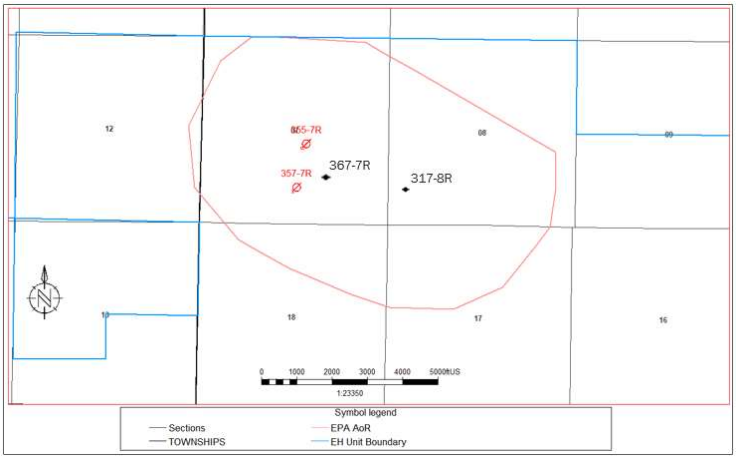


Table 1: Example core report data of the MICP porosity and permeability from well 317-8R.

DEPTH	ANALYSIS_LAB	DATE	SAMPLE_ID	CKHA	CPOR	CKHA_C	SYSTEM
feet				mD	%	mD	
8865	CORE LABORATORIES	8/6/1975	1	215	24	160	air-brine
8868	CORE LABORATORIES	8/6/1975	2	72	20.7	58	air-brine
8869	CORE LABORATORIES	8/6/1975	3	21	18.7	13	air-brine
8948	CORE LABORATORIES	8/6/1975	4	42	17	39	air-brine
8952	CORE LABORATORIES	8/6/1975	5	54	17.9	50	air-brine
8960	CORE LABORATORIES	8/6/1975	6	39	16.5	37	air-brine
8971	CORE LABORATORIES	8/6/1975	7	24	17.2	19	air-brine
8974	CORE LABORATORIES	8/6/1975	8	91	20.1	75	air-brine